

REMARKS

Claims 27-40 are pending in this application. By this Amendment, claims 1, 5-9, 11, 15-17, 19, 21, 22, 24 and 26 are canceled, and claims 27-40 are added. Support for the new claims may be found, for example, in the specification at paragraphs [0073] and [0089], and in the original claims. No new matter is added.

In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

I. Rejections Under 35 U.S.C. §103

The Office Action rejects under 35 U.S.C. §103(a):

- (1) Claims 1, 5, 7-9, 11, 15, 19, 24 and 26 as having been obvious over U.S. Patent No. 5,942,356 to Mitsui et al. ("Mitsui I") in view of JP 2001-303243 to Watanabe et al. ("Watanabe");
- (2) Claim 6 as having been obvious over Mitsui in view of Watanabe, and further in view of JP 07-128840 to Okubo ("Okubo I");
- (3) Claim 17 as having been obvious over Mitsui in view of Watanabe, further in view of U.S. Patent No. 5,935,735 to Okubo et al. ("Okubo II");
- (4) Claim 16 as having been obvious over Mitsui in view of Watanabe, further in view of U.S. Patent No. 4,938,798 to Chiba et al. ("Chiba"); and
- (5) Claims 21 and 22 as having been obvious over Mitsui in view of Watanabe, and further in view of U.S. Patent No. 6,087,047 to Mitsui et al. ("Mitsui II").

By this Amendment, claims 1, 5-9, 11, 15-17, 19, 21, 22, 24 and 26 are canceled, and claims 27-40 are added. To the extent the rejections apply to claims 27-40, Applicant respectfully traverses the rejections for at least the reasons discussed below.

A. Mitsui And Watanabe

Claim 27 is directed to a method for manufacturing a phase shift mask blank comprising the step of selecting a target having a predetermined hardness as the rate of generating defects becomes below a desired value, based on a correlation that a rate of generating defects in a light semi-transmitting film becomes lower as a hardness of a target becomes higher. The applied references would not have rendered obvious a method comprising this step for at least the following reasons.

The Office Action, at pages 2-4, asserts that Mitsui I teaches a method for manufacturing a phase shift mask blank by sputtering in an atmosphere containing nitrogen using a target containing metal and silicon to deposit a light semi-transmitting film containing metal, silicon and nitrogen on a transparent substrate. The Office Action acknowledges that Mitsui I fails to teach, among other claim features, the step of using a target with a hardness that will reduce defects in the deposited film. The Office Action relies on Watanabe, which allegedly teaches the step of using a metal silicide target with a Vickers' hardness of 1300 or less to produce films without defects to assert that Mitsui I and Watanabe would have rendered obvious the claimed method. Applicant respectfully disagrees.

Mitsui and Watanabe, alone or in combination, fail to disclose that an increase in the degree of hardness of a target correlates to a decrease in the rate of generating defects, much less the step of selecting a target having a predetermined hardness as the rate of generating defects becomes below a desired value based on such a correlation. Mitsui I merely teaches that in order to obtain a thin film of a desired composition, while ensuring the discharge stability during film formations, it is preferred that a phase shift layer includes nitrogen, metal and silicon by sputtering atoms from a target that contains 70 to 95 mol% silicon and metal in an atmosphere containing nitrogen. See Mitsui I at col. 6, lines 56-62. Mitsui I is completely

silent with respect to a correlation between the hardness of a target and the rate of generating defects in a light semi-transmitting film.

Watanabe teaches that in order to prevent generation of particles in a metal silicide target, the residual stress of the target is released by lowering the hardness of the metal silicide target. See Abstract. Watanabe further teaches the correlation that the generation of particles in a metal silicide target is decreased as the hardness of the target becomes lower. For example, Watanabe teaches that when a Vickers' hardness of Mo silicide target is 1320 HV, the number of particles of 0.2 mm or more is 174 pieces/sheet (Comparative Example 3), when the Vickers' hardness is 1020 HV, the number of particles is 19 pieces/sheet (Example 3), and when the Vickers' hardness is 998 HV, the number of particles is 14 pieces/sheet (Example 4). Thus, Watanabe fails to teach the correlation that the rate of generating defects in a light semi-transmitting film becomes lower as the hardness of a target becomes higher, but instead teaches the correlation that the generation of particles is decreased as the hardness of the target becomes lower.

Furthermore, an ordinarily skilled artisan would not have had any reason or rationale to manufacture a phase shift mask blank according to the claimed method because an ordinarily skilled artisan would not have recognized the specific technical problem of reducing the generation of pinholes and half pinholes in the light semi-transmitting film, which are defects that create a significant problem in light semi-transmitting films. See specification at page 6, lines 8-21; and page 23, lines 10-23. Although Watanabe teaches the suppression of the generation of particles in a metal silicide target, Watanabe is silent with respect to pinholes and half pinholes on the metal silicide target. See Abstract. Thus, an ordinarily skilled artisan would not have had any reason or rationale to manufacture a phase shift mask blank in accordance with the claimed method. This is because, in view of the applied references, an ordinarily skilled artisan would not have recognized that performing

the recited steps of the claimed method would reduce the rate of generation of pinholes and half pinholes in the light semi-transmitting film.

For at least these reasons, the applied references would not have rendered obvious claim 27. Claims 28-40 depend from claim 27 and, thus, claims 28-40 also would not have been rendered obvious by the applied references for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

B. Okubo I, Okubo II, Chiba And Mitsui II

Deficiencies of Mitsui I and Watanabe with respect to claims 27-40 are discussed above. Okubo I, Okubo II, Chiba and Mitsui II, which are applied by the Office Action for various additional features recited in the claims, do not cure deficiencies of Mitsui I and Watanabe.

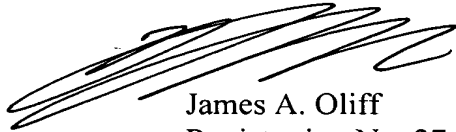
Thus, the applied references would not have rendered obvious claims 27-40. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 27-40 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
Request for Continued Examination

Date: September 9, 2010

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